

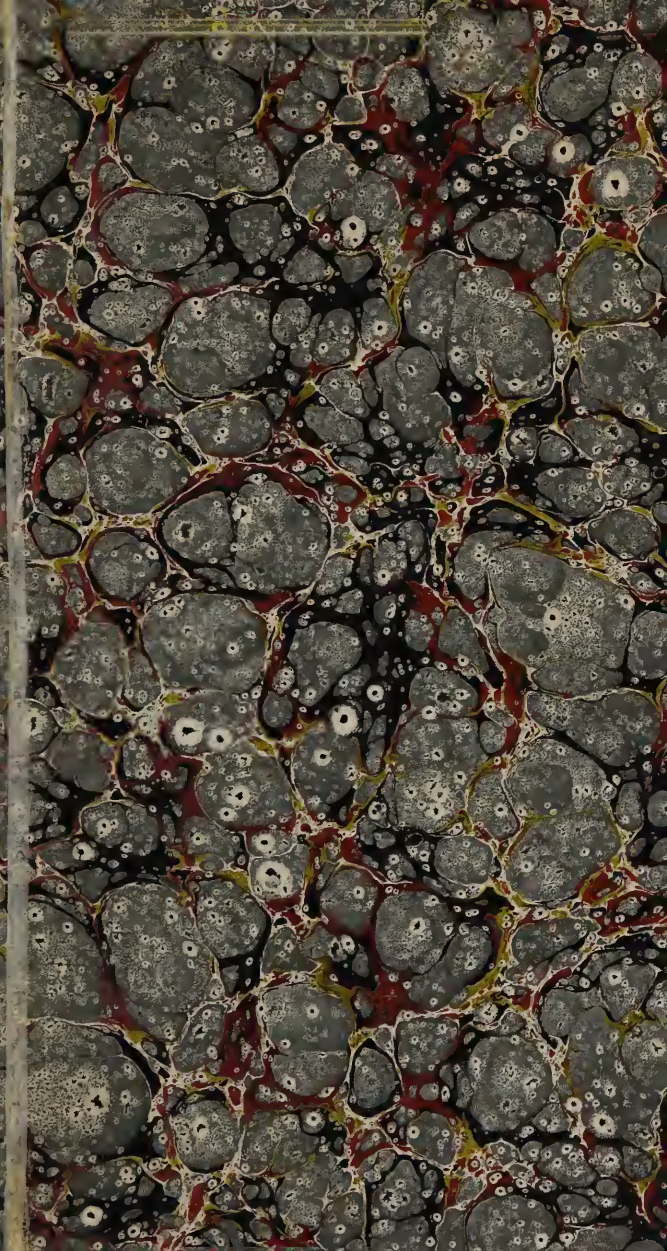
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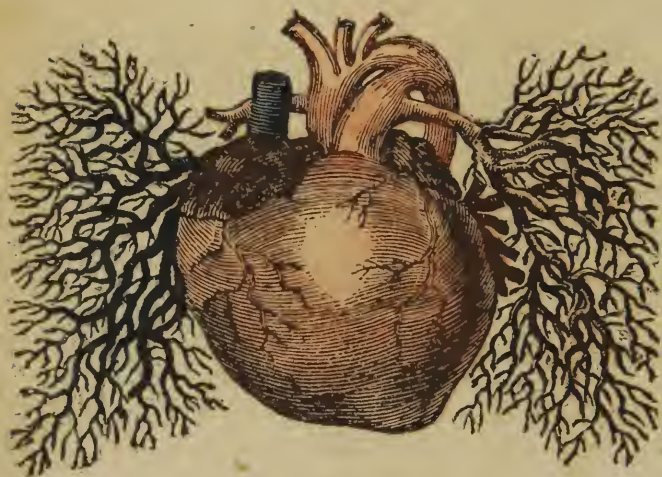






AN

ANALYTICAL VIEW



An  
Wisdom we're Form'd,  
By  
Goodness Sustain'd.

AN  
ANALYTICAL VIEW  
OF THE  
ANIMAL ECONOMY.

CALCULATED FOR  
The Students of Medicine,  
AS WELL AS  
PRIVATE GENTLEMEN;

Interspersed with many allegories and moral reflections,  
drawn from the subject,

TO AWAKEN THE MIND TO AN ELEVATED SENSE  
OF THE

GREAT AUTHOR OF NATURE.

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By ISAAC BALL,

*Physician and Surgeon, and Diplomatic Member of the  
Medical Society of the City and County of New-York.*

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Quum nobis denegatur diu vivere, aliquid relinquamus  
quod nos vixisse testetur.

*Since it is denied us to live long, let us leave something  
which may prove that we have lived.*

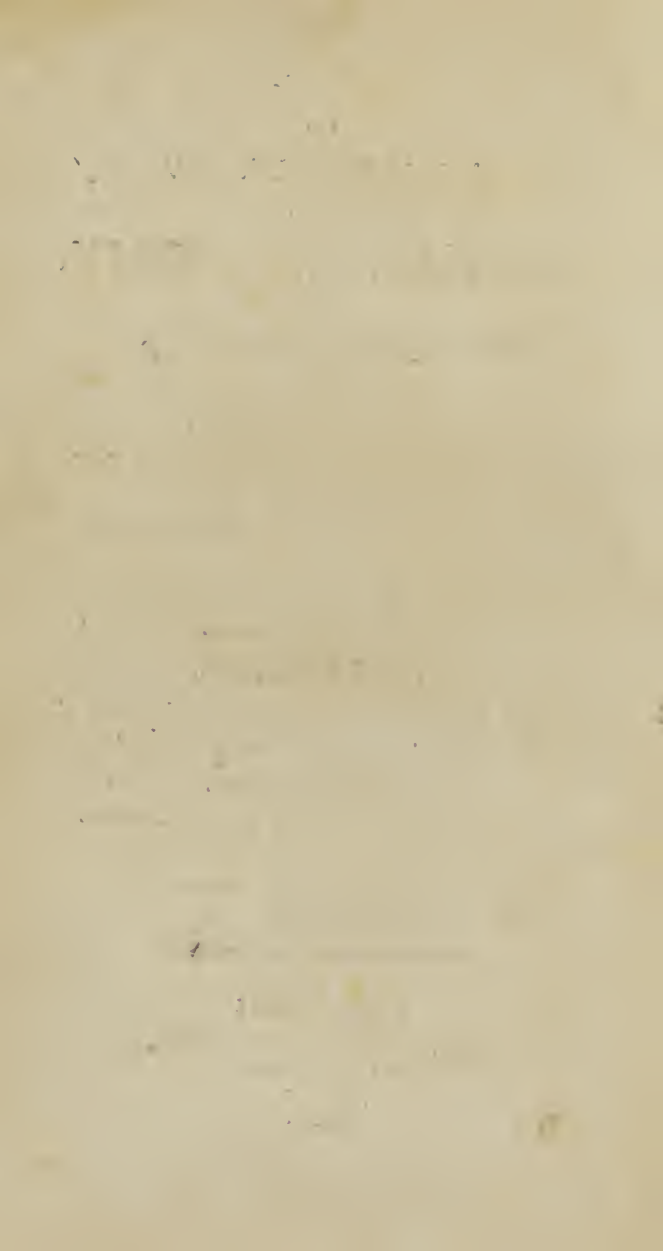
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New-York

PRINTED FOR THE AUTHOR,

BY G. J. HUNT.

1808.





## P R E F A C E .

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*MY declining years and late ill state of health, having, in a great measure, excluded me from those active medical pursuits in which (at least I hope) for the public good, I have been employed upwards of thirty years—and presume, with success and satisfaction, to my friends and fellow citizens.*

*My moments of leizure I determined to employ in writing the following pages, the subject, I trust, will not be considered as unworthy the attempt, nor unacceptable to my respected readers—having endeavoured to select such language as may meet the level of every capacity.*

*“ Of all the diversions in life, there is none so pleasing to fill up its empty spaces, as the reading of useful and entertaining Authors :” an elegant writer thus expresses himself, “ a good book is a good companion,” and with that, the conversation of a well selected and intelligent friend.*

I. B.

# ILLUSTRATION.

## THE FRONTISPIECE

Represents the heart, and arborescent branches of the pulmonary arteries and veins, to supply those organs with the vital fluid.

## THE VIGNETTE

Represents the dawning of life, under the figure of an infant, resting on a lyre, whose seven strings are emblematical of the seven ages of man, "*whence life must downward tend.*" As the concordance of sounds produces harmony, so the harmony of the animal and vital functions, produces concordance, health, and longevity.

—\*00000\*

DISTRICT OF NEW-YORK, ss.

*BE IT REMEMBERED*, That on the twenty-fifth day of January, in the thirty-second year of the Independence of the United States of America, ISAAC BALL, of the said District, hath deposited in this office, the title of a book, the right whereof he claims as proprietor, in the words following, to wit :

"An Analytical View of the Animal Economy, calculated for the Students of Medicine, as well as private gentlemen; interspersed with many allegories and moral reflections, drawn from the subject, to awaken the mind to an elevated sense of the Great Author of Nature.—By Isaac Ball, Physician and Surgeon, and Diplomatic Member of the Medical Society of the city and county of New-York.

Quum nobis denegatur diu vivere, aliquid relinquamus quod nos vixisse testetur.

*Since it is denied us to live long, let us leave something which may prove that we have lived."*

In conformity to the Act of the Congress of the United States, entitled "An Act for the encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned," and also to an Act entitled "An Act supplementary to an Act entitled An Act for the encouragement of Learning, by securing the Copies of Maps, Charts, and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

EDWARD DUNSCOMB,  
*Clerk of the District of New-York.*

AN  
ANALYTICAL VIEW  
OF THE  
*ANIMAL ECONOMY.*

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“ WHEN life is new the ductile fibres feel  
The heart’s increasing force, and, day by day,  
The growth advances, till the larger tubes,  
Acquiring (from their elemental veins,  
Condensed to solid chords) a firmer tone  
Sustain, and just sustain—the impetuous blood :  
Here stops the growth. With overbearing pulse,  
And presure, still the great destroy the small,  
Still with the ruins of the small grow strong, •  
Life grows mean time, amid the grinding force

Of viscuous fluids, and elastic tubes ;  
 In various functions vigorously are plied,  
 By strong machinery, and in solid health  
 The man confirmed, long triumphs o'er disease ;  
 But the full ocean ebbs, there is a point  
 By nature fix'd, whence life must downward tend, )  
 For still the beating tide consolidates  
 The stubborn vessels, more reluctant still  
 To the weak throbs of the ill supported heart ;  
 These languishing, these strengthening by degrees  
 To hard unyielding unelastic bone,  
 { Thro' various channels the congealing flood  
 Crawls lazily, and hardly wanders on ;  
 It loiters still—and now it stirs no more. }  
 This is the period few attain, the death  
 Of nature, thus (so heaven ordain'd it) life  
 Destroys itself, and could these laws have chang'd,  
 Nestor might now the fate of Troy relate,  
 And Homer live immortal as his song."

---

It is said that in a new born infant the  
 pulse vibrates about 134 strokes in a minute  
 —in middle age from 60 to 80, and in ex-  
 treme old age from 50 to 24.

# RESPECTFULLY ADDRESSED

TO OUR

*Fair Readers.*

---

“Connubial fair ! whom no fond transport warms  
To lull your infant in maternal arms ;  
Who, bless’d in vain with tumid bosom, hear  
His tender wailing with unfeeling ear ;  
The soothing kiss and milky rill deny  
To the sweet pouting lip, and glist’ning eye !  
Ah ! what avails the cradles damask roof ?  
The downy bolster and embroidered woof  
Oft hears the gilded coach unpity’d ’plains,  
And many a tear the tassel’d cushion stains !  
No voice so sweet attunes his cares to rest,  
So soft no pillow as his *mother’s breast !*”

---

Presuming causes, forbidding this maternal regard, such as sickness, inability, or otherwise necessarily obliging a transfer of their infants to proxy, we sketch out instructions in the choice of a wet-nurse.



# QUALIFICATIONS

FOR

## *A NURSE.*



We say it is not sufficient that a wet-nurse should be only clean, sober, healthy, and temperate, but likewise middle aged, because they will have more milk than the very young, and more and better than the old ; this is a very material consideration, when they have each their own child to suckle besides.— Those between twenty and thirty are certainly the best age. Great regard should be had to their lying-in, and those procured who have not been brought to bed more than three months, for nature intending that a child should suck only twelve months, the milk seldom continues good much longer, for about that time women though they give suck, the female constitution manifests a sensible revolution, and some that are very sanguine much sooner, which, and other causes, disturb and affect the milk greatly, and therefore are not so proper for nurses.

The nurse's diet should consist of a proper mixture of animal and vegetable food, she should eat one hearty meal of salted meat every day, with a great deal of vegetables and

little bread, and thin broth or milk for breakfast and supper, and her strongest drink good ale or porter.

If the child has not suckled its own mother it should have a little purgative physic in a day or two after its birth, to carry off the meconium, for this purpose, may be given a little infusion of Senna, or the nurse some lenitive electuary, which through the medium of the milk, will act on the intestinal tract of the child, by this means three or four evacuations will be procured in 24 hours.

The child should be kept awake by day, as long as it is disposed to be so, and great care should be taken that no anodyne empiric medicine be given, or means taken to lull them to sleep, or continue them to sleep long, which is too much the custom to save their own time and trouble, to the great detriment of the child's health, spirits and understanding. If the nurse has another child to support with her own milk, the sooner the child is begun to be fed as we presume to recommend, that is a healthy child, it should be allowed some fruit, either raw, stewed, or baked, and the produce of the Cullinary gardens, which, in moderation is perfectly grateful and salutary. As soon as the child has any teeth it may be used to a little animal food, which they will be more fond of than confectionary or pastry, with which it should never deprave its taste.

# Address

TO

## STUDENTS IN MEDICINE.

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GENTLEMEN,

I offer these sheets to you as being the basis of lectures of the most eminent anatomists, and as containing a brief view of the varied departments of the animal body.

From a desire of being useful in my profession, I have ventured to present this compilation for your perusal, and have no doubt of your favorable acceptance of it, nor of your candid interpretation of my views.

Should you propose to pursue your researches in anatomy (the basis of medical science) in attending the school established at Columbia College, or elsewhere, by making observations, and taking notes of extraordinary morbid appearances in the cadaverous subject, and by proposing them occasionally as the subjects of your reflection, you will derive great and permanent advantages ; from such rational experience you may expect to acquire a degree of confidence in yourselves, and will be animated to proceed in your honorable pursuits, with proper resolution.

Pursue then, with zeal and perseverance, the steps that lead you to knowledge, and an elevated understanding in your profession ; and *support* the credit and dignity of medical science, with honor to yourselves and your country.

The youth, who, led by *Wisdom's* guiding hand,  
 Seeks *Virtue's* temple, and her law reveres,  
 He, he alone, in *Honor's* dome shall stand,  
 Crown'd with rewards, and rais'd above his peers,  
 Recording annals shall preserve his name,  
 And give his virtues to immortal *Fame*.

With sincere wishes for your success  
 and happiness in life, and with sentiments of earnest solicitude for your interest and advancement in our honorable profession,

*I remain.*

*Gentlemen,*

*Your affectionate friend,*

ISAAC BALL.

# ANATOMY.

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Anatomy is a science which explains the structure and use of every part of the human body.

The examination of brute animals, fishes, reptiles, plants, polypi, &c. in order to illustrate more clearly, or to demonstrate by analogy, the structure and functions of man, is called comparative anatomy.

*ANATOMY IS DIVIDED INTO NINE PARTS,  
VIZ.*

Osteology	} Or Doctrine of the	Bones
Syndesmology		Ligaments
Myology		Muscles
Bursalogy		Bursæ Mucosæ
Angiology		Vessels
Neurology		Nerves
Adenology		Glands
Splanchnology		Viscera
Hygrology		Fluids..



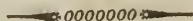
# Plan.

<i>Bones of the Head.</i>	Bones of the Cranium or Skull.	Os Frontis . . .	1
		Ossa Parietalia . .	2
		Os Occipitis . . .	1
		Ossa Temporalia . .	2
		Os Ethmoides . . .	1
		Sphacnoides . . .	1
	Bones of the Face.	Ossa Maxillaria sup	2
		—— Jugalia . . .	2
		—— Nasalia . . .	2
		—— Lachrymalia . .	2
		—— Palatina . . .	2
		—— Spongiosa infer	2
	Dentes or Teeth.	Os Vomer . . .	1
		— Maxillare infer	1
		Incisores . . .	8
		Cuspidati . . .	4
		Bicuspides . . .	8
	Bone of the Tongue, or Os Hyoides	Molares . . .	8
		Sapientiaë . . .	4
	Bone of the internal Ear, situated within the Temporal bone.	Os Hyoides . . .	1
		Malleus . . .	2
		Incus . . .	2
		Stapes . . .	2
		Os Orbiculare . .	2

Brought over 63

<i>Bones of the Upper Extremities.</i>	The Spine.	{	Vertebræ	{	Cervical	7
					Dorsal	12
					Lumbar	5
	The Thorax.	{	Sacrum	{	.	1
					.	1
					.	1
	The Pelvis.	{	Sternum	{	.	1
					.	24
					.	2
		The Shoulder.	{	Clavicula	{	.
.						2
.						2
The Arm.		{	Os Humeri	{	.	2
					.	2
					.	2
Forearm.		{	Ulna	{	.	2
					.	2
					.	2
		The Hand.	{	Carpus or Wrist.	{	Os Naviculare
	— Lunare					2
	— Cuneiforme					2
	— Orbiculare .					2
	— Trapezium					2
	— Trapezoides					2
	— Magnum .					2
	— Unciforme					2
	Metacarpus					10
	Phalanges					28

		Brought over 180	
<i>Bones of the Lower Extremities</i>	The Thigh.	Os Femoris . . . .	2
		{ Patella . . . .	2
	The Leg.	{ Tibia . . . .	2
		{ Fibula . . . .	2
		{ Os Calcis . . . .	2
	The Foot.	{ Tarsus. { — Astragalus . . . .	2
		{ — Cuboides . . . .	2
		{ — Naviculare . . . .	2
		{ — Cuneiformia . . . .	6
		{ Metatarsus . . . .	10
		{ Phalanges . . . .	28
			<hr/> 240
Sesamoid bones of the Thumb and		}	8
Great Toe, occasionally found			
			<hr/>
Total,			248



The Egyptians at their feasts, to prevent excesses, presented a

## Skeleton,

Before their guests—with this Motto—

“Remember ye must  
be shortly thus.”

## Elevation.

---

LET us begin with the less adorned but more solid parts which support and defend the rest.

First we have a system of bones, made in a variety of shapes, in a variety of sizes—all strong, that they may bear up the machine, yet light, that they may not weigh us down, hollowed with an inward cavity to contain the moistening marrow, and perforated with fine ducts, to admit the nourishing vessels.

They are larger at their extremities—and insensible—that they may be joined more firmly, and not be hurt by pressure.

The manner of their articulation is truly admirable and remarkably various, yet never varied without demonstrating some wise design, and answering some valuable end.

Frequently when two bones are united, the one is nicely rounded and capped with a smooth substance, the other is scooped into a hollow of the same dimensions to receive it,

and both are lubricated with an unctious fluid to obviate the evil of friction, and to facilitate rotation.

These are connected by ligaments, a tough and strong arrangement of fibres, which render what would otherwise be an elegant, yet useless assemblage of parts, a well compacted and manageable system.

The feet compose the finest pedestal, infinitely beyond all that statuary can accomplish, capable of altering its form, and extending its size, as different circumstances require.

The undermost part of the heel, and the extremity of the sole, are shod with a tough insensible substance, a kind of natural sandal which never wears out, never wants repair, and which prevents an undue compression of the vessels by the weight of the body.

The legs and thighs are like stately columns so articulated that they are commodious for walking, and yet adapted to the easy posture of sitting.

The ribs turned into a regular arch, are gently moveable for the act of respiration,



they form a safe lodgment for the lungs and heart, the two most important organs of life.

The back bone is designed not only to strengthen the body, but to shield the continuation of brain, usually termed the spinal marrow, which is almost an infinite assemblage of nerves !

By commodious outlets, it transmits these silver cords, to different parts of the body.

Had it been a single bone, the loins must have been inflexible, to avoid which, it consists of a number of small bones which articulate together, and are strengthened by compact ligaments.

By this means it is capable of various inflections, without injuring the cords of life or diminishing that strength, which is so much required here.

This peculiarity of structure gives the back bone the pliancy of the osier, with the firmness of the oak ; such a formation in any other of the solids must have occasioned great inconvenience, here it is unspeakably useful, a master piece of creating skill.

The arms are exactly proportioned to each other, to preserve the equilibrium of the structure.

These being the guards to defend, and the ministers that serve the whole body are fitted for the most diversified and extensive operations, firm with bone, yet not weighty with flesh, and capable of performing all useful motions ; they bend inward, and move outward, they move upward or downward, they wheel about in what ever direction we please.

To these are added stands, terminated by the fingers, not of the same length, nor of equal bigness, but in both respects different, which give more beauty and far greater usefulness..

Were they all flesh they would be weak, were they one entire bone they would be utterly inflexible, but consisting of various little bones, and muscles, what shape can they not assume !

Being placed at the end of the arm, the sphere of their actions is exceedingly enlarged.

Their extremities are an assemblage of the finest nerves acutely sensible, which notwithstanding, are destined to almost incessant employ, and frequently among rugged objects.

For this reason they are overlaid with nails, which preserve them from any violent injury.

The hand is the original and universal sceptre which not only represents, but ascertains our dominion over all the elements, and over every creature.

To these hands we owe the most beautiful statues, the most melodious instruments of music.

By the strength of the hand the tallest firs fall, and the largest oak descend from the mountain.

Fashioned by the hand, they become a floating ware-house, and carry the productions of art from America, and unfurl the spreading canvass to the breeze, in the remotest corner of the universe.

Though we have not the strength of the horse, nor the swiftness of the greyhound,

nor the quick scent of the spaniel, yet directed by the understanding and enabled by the hand, we can, as it were, make them all our own.

These short hands have found a way to penetrate the bowels of the earth.

These feeble hands can manage the wings of the wind, arm themselves with the violence of thunder, and press into their service the forcible impetuosity of water !

How greatly then, are we indebted to our infinitely wise Creator, for distinguishing this invaluable member !

Above all is the head, for the residence of the brain, rounded to receive, and firm to defend it.

This is screened from heat, defended from cold, and at the same time beautified by the hair ; a decoration so elegant, that no art can supply ; so perfectly light as in no way to incumber the wearer.

While other animals are prone in their aspect, the attitude of man is erect, which is by far the most commodious for the prosecution of all his extensive designs—does it not re-

mind us of our noble original, and our sublime end ?

Struck with the grandeur of the subject, we would fain set forth all its beauties, but our pencil which is too faint, cannot correspond with the vivacity of the countenance ; how, indeed, can any one describe with energy, these admirable proportions ; these features, full of force and dignity, expressing to all beholders the tender emotions and passions as they arise in the heart ; this open and elevated brow, these lively and piercing eyes, eloquent interpreters of the sentiments of the soul ; this mouth, the seat of smiles ; these ears, whose delicacy catches even the softest whispers !

If you take a still further survey of this beautiful edifice, the prodigious number of its parts, their surprising diversity, admirable construction, wonderful harmony, and infinite art, displayed in the distribution of them, it will throw us into such an extacy, that we shall no sooner recover from it than complain of our want of sufficient inclination



and ability to admire such marvellous excellency.

Here are arteries, the rivers of our little world, that striking out as they go into numberless small canals, visit every street, yea every apartment in the vital city.

They are not like several of the veins near the surface, but placed at a sufficient depth, and thereby are more secure from external injuries.

The arteries also commence by collateral branches with each other, so that if any thing block up or straighten the direct passage, the current by directing to this new channel eludes the impediment, flows on and soon regains its wonted course.

The blood thrown from the heart dilates instantly the arteries, whose fibres by their irritability or elastic power re-act on the blood, by which means, as they propel it onward they vibrate against the finger, and much assist the physician in the discovery and cure of diseases.

The extreme branches of arteries terminate in veins, which may be considered as uniting

again into larger branches, then again into branches still larger, and so on continually, till at last they form one large pipe or trunk, which re-conveys the blood to the heart.

The arteries are composed of several principal membranes placed on each other, one of these is highly elastic.

The veins not being designed to exercise the same function as the arteries, want this elastic coat, and the texture of them altogether is considerably slighter: such an exact œconomist is nature, amidst all her liberalities !

At the root of the arteries, and in the inner part of the veins are placed little sluices or valves, which by sinking and rising again, open and shut the canal.

These are found only when the blood is constrained to climb, for where the ascent ceases, they cease also.

In the centre of the breast, between two spongy masses, known by the name of the lungs, is deposited a fleshy and hollow pyramid, called the heart. This pyramid has an

apex or point, turned towards the left side, and is the main spring of the animated machine.

The ramifications of the bronchia or wind-pipe, which are dispersed throughout the lungs carry thither the vivifying air, which by acting on the spongy mass opens, dilates and extends them, and by that means facilitates the course of the blood.

Such indeed are the admirable organs destined for the circulation of the blood ; but how greatly does this imperfect sketch fall short of the reality ! How incapable are the outlines of expressing the beauties of this noble subject !

There is in the consideration of the organs performing the circulation of the blood, an air of grandeur that seizes forcibly on the mind, and penetrates it with the highest admiration.

Far less magnificent in its plans, less skilful in the execution of them, hydraulics offer us but faint images of this miracle in those machines, by means of which water is distributed into every quarter of a great city.

The works of the Creator must be compared to the emanations of the same infinite mind, ever like himself, HE has impressed on all his productions a character of nobleness and excellence, which demonstrate their divine original.

But what are those excellent discoveries philosophy has made, compared with the beauties that are still concealed from our view ! The gloom of night veils many important truths concerning the animal body, and you are desirous of chasing them away.

May the dawn of that day, ere long gild the horizon of this Western World ! And may the time of its breaking forth upon us be not afar off !

The glands are an assemblage of tortuous vessels, complicated with seeming confusion, yet perfectly regular.

We cannot as yet penetrate into the mystery of secretion, all that we know is, that those fluids said to be secerned are not absolutely contained within the blood, any more than the peach, nectarine, or other fruits,

are principles filtered from the earth and water, which nourish the tree.

Nevertheless, as the seven notes of music differently combined, and the twenty-four letters, form the whole of harmony and language, so may all those fluids, arise from the change of combinations of primitive parts, by a machinery that no chymist can ever perfectly imitate.

We have nerves, which shoot out their fibres from the brain, and when remote from their source, are surprizingly minute—which set the muscles to work at the command of the will, and diffuse sensation throughout the body; and, upon any impression without, give all needful intelligence to the soul.

We have membranes, thin and flexible coverings, to enwrap the fleshy parts, to connect some, and form a separation between others.

We have muscles, composed of the finest fibres, yet indowed with incredible strength, fashioned after a variety of patterns, but all in the highest taste for elegance and use.—

These execute their functions as quick as lightning. Were we to remove mountains, we could not be more astonished, than that this arm, these fingers should obey the order of the will.

To turn the screw, or work the lever, is laborious and wearisome; but we work the vertebræ of the neck, with all the appendant parts; we advance the leg with all the incumbent body; we rise, we spring from the ground, and though so great a weight is raised, we meet with no difficulty or fatigue.

That all this should be effected without any toil, by a bare act of the will, is very surprizing: but that it should be done, even while we are entirely ignorant of the manner in which it is performed, is most astonishing.

We have fat, an unctious fluid, contained in vesicles, which have the appearance, if viewed through a microscope, of a cluster of grapes.

This flanks and fortifies our muscles, like a strong bastion, supports and warms them like a soft pillow. It fills up the vacuities, and smooths the irregularities of the flesh;

inwardly, it supplies the machine for motion ; outwardly, it renders it smooth and graceful.

The skin is a curious surtout, which covers the whole, formed of the most delicate net-work, whose meshes are minute, and whose threads are multiplied even to a prodigy ; the meshes are so minute, that nothing, discernible by the eye, passes through them, though they discharge, every moment, myriads and myriads of superfluous incumbrances. [*Note.* The perspirable fluid is supposed to be two parts fixed air, and one part azotic air and water, impregnated with different saline matter.]

These threads are so multiplied, that neither the point of the most delicate needle, nor the infinitely finer lance of a gnat, can pierce any part, without drawing blood, and causing an uneasy sensation, consequently wounding, by so small a puncture, both a nerve and a vein.

But a course of incessant action must exhaust the solids, and waste the fluids, and unless both be properly recruited, the machine would be destroyed.



For this reason our body is furnished with the organs, and indowed with the power of nutrition.

We have teeth, tests of heat and cold ; the foremost thin and sharp, to bite asunder the food ; the side teeth for the purpose of tearing, and the hindermost broad and strong, indented with small cavities, the better to grind into pieces what is committed to them.

Were the teeth, like other bones, covered with the periosteum, chewing would give much pain ; were they quite naked, they would soon decay and perish ; to guard against both, they are covered with a neat enamel, harder than the bone itself, which gives no pain in chewing, and yet secures them from various injuries.

The lips prevent the food from slipping out of the mouth, and, assisted by the tongue, return it to the grinders.

While they do this in concert with the cheeks, they squeeze out a thin liquor from the adjacent glands, this moistens the food and prepares it for digestion.

When the mouth is inactive those glands are nearly closed ; but when we speak or eat, their moisture being then necessary, is expressed as needs require.

But the food could not descend merely by its own weight, through a narrow and clammy passage, into the stomach. .

Therefore, to effect this, fibres, both straight and circular, are provided ; the former enlarge the cavity and give an easy admittance ; the latter closing behind the descending aliment press it downward. .

But before the food enters the gullet it must of necessity pass over the orifice of the wind-pipe, whence it is in danger of falling upon the lungs, which might endanger immediate suffocation.

To obviate this, a moveable lid, or centinel, is placed, which, when the smallest particle advances, is pulled down and shut close, but as soon as it is swallowed, is again let loose and stands open.

Thus the important pass is always made sure against any noxious approaches, yet left free for the admission of air, and for respiration. .

The food, descending into the stomach, is not yet ready for the bowels ; therefore, that great reservoir is strong to bear, and fitted to retain it, till it is properly wrought into the smoothest pulp, by the power of the gastric juice, a fluid secreted in the stomach itself.

From hence it is discharged by a gentle force, and passes gradually into the intestines.

Near the entrance of this canal are the ducts of the pancreas and gall-bladder, which are stimulated by the chyme. [*Note.* This term is used to express the aliment when dissolved in the stomach.]

The pancreas is connected with the spleen, which as the stomach becomes filled is pressed by it, and in consequence pours into this gland a greater quantity of blood, to be changed into pancreatic juice.

The gall-bladder is attached to the liver, and is the reservoir to retain the bile, which pierces the intestines, and blends the oil and aqueous parts into one homogeneous mass.

It is furnished with a valve, of a very peculiar nature ; namely, of a spiral form, through which the detersive liquid can only

gently ouze. Admirable construction ! which gives the needful supply, as occasion may require, and no more !

The nutriment then pursues its way through the mazes of the intestines.

Had these been strait or short, the food could not have resigned a sufficient quantity of its nourishing particles ; therefore it is artfully convolved, and filled with numberless folds or plaits, and of great length.

Along the sides of the winding passage, countless multitudes of minute vessels protrude themselves, and absorb the nutritious juices.

As the aliment proceeds, it is more and more drained of its nutritious juices. Glands are, therefore, posted in the proper places to discharge a lubricating fluid ; these are smaller, or fewer, in and near the stomach, because there the aliment is moist enough ; whereas, in the bowels, remote from the stomach, they are either multiplied or enlarged.

The chyle drawn off by the lacteals, is carried through millions of tubes, whose perforations is too fine, even for the microscope to

discover. To this it is owing that nothing enters the blood but what is capable of passing the finest vessels.

It is then lodged in several commodious cells, the glands of the mesentery, and there mixed with a thin diluting lymph, which makes it more apt to flow.

Here it is conveyed to the common receptacle and mounts through a perpendicular tube to be poured into the left subclavian vein; there it mixes with the blood and loses the name of chyle.

From this vein the new blood passes into the upper branch of the principal trunk of veins, which carries it towards the heart.

It then passes into the right auricle of the heart, which opens at its approach, and by closing immediately, forces it into the right ventricle, which is dilated to receive it.

The ventricle instantly contracts itself (the valve with which it is furnished, raising itself to oppose the reflux into the auricle) and the blood is compelled to pass into the great artery, which is appointed to carry it to the lungs.

The pulmonary artery, which is sub-divided into two trunks, which pass to the right and left lobes, composing the lungs (its valve preventing the reflux into the heart) by contracting, drives the blood into every part of that organ.

In the spongy cells of this amazing laboratory, the blood imbibes the oxygen portion of the external air, and assumes, in consequence, a more brilliant colour.

Thus improved, it enters the left auricle of the heart by the four pulmonary veins, and in proportion to the oxygen air contained within the blood, the left auricle of the heart obedient to the stimulus, contracts and forces it into the left ventricle.

The latter, by contracting itself pushes the blood into the aorta, which, by continually dividing and sub-dividing itself, distributes its balsamic liquor to all parts of the body, in order to promote their support or growth, occasion different secretions, and distribute the animal heat.

By this astonishing mechanism and dependence of the vital principle in the air, the

powerful energy of the heart, seconded by that of the arteries, transmits the blood to the most remote parts of the body, notwithstanding the resistance which gravity, friction, and many other circumstances make to it in its course.

The large muscles of the arm, or of the thigh, are soon wearied ; a day's labour or a day's journey exhausts their strength ; but the heart toils whole weeks, whole months ; nay, years, unwearied ; is equally a stranger to intermission and fatigue.

The heart receiving the distending, and stimulating power of the blood contracts on it, and in one minute, such is its amazing force, it propels, says Baron Haller, fifty-one pounds of blood, through tubes of different dimensions, which if measured would extend beyond 149 feet. In a healthy person it contracts not much less than 5000 times in an hour, perpetually in the same order, and never with fatigue.

The pulse arises from the dilations, and contractions of the arteries, which in some measure correspond with those of the heart.



Impelled by the aorta, (for its valves prevent the reflux into the heart) part of the blood shoots upwards to the head ; part rolls through the whole body ; but how shall a stream divided into myriads of channels be brought back to its source ?

For this purpose the all wise Creator, has connected the extremities of all the arteries with the beginning of the veins ; so that the same force which darts the blood through the former, helps to drive it through the latter.

The blood entering the right auricle, by the two opposite currents of the vena cava superior and inferior, that the streams may not clash, a fibrous excrescence interposes, which like a projecting pier, breaks the stroke of each, and throws both into their proper receptacle.

Thus is the blood re-conducted to the great cistern, and thence played off a fresh, first through the lungs, and then throughout the body.

We see then even from this imperfect survey, that man is a very complex machine.

In it there is a peculiarity which claims particular notice; a power which defies all human ingenuity and imitation, and distinguishes the natural from the artificial machine.

As our bodies are composed of flexible materials, whereby they are liable to receive injuries by too rude a shock from harder bodies, and as the humours are also subject to receive alterations from changes of weather, irregularities in diet, and other accidents, it was needful that the body, besides the power necessary for its performing all the functions requisite in a healthy state, should be provided also with other powers, whereby hurts and deviations from a healthy condition, might be amended and restored.

Were there not such a power in the body we could scarcely arrive at full age, in any other than a disfigured condition, and the loss of the due action of many parts. But our Creator has kindly provided, that the body, upon any wound received, should supply a cement, whereby the divided parts are again re-united, or throw out granulations, by

which the breach is healed up. Thus a broken bone is made firm again by a callous; a dead part is separated and thrown off; noxious juices are driven out by some of the emunctories; a redundancy is removed by some spontaneous discharge; a bleeding naturally stops of itself, and a great loss of blood from any cause, is in some measure, compensated by a contracting power in the vascular system, which accommodates the capacity of the vessels, to the quantity contained.

Thus the stomach gives information when the supplies have been expended; represents with great exactness, the quantity, and the quality of what is wanted in the present state of the machine; and, in proportion as she meets with neglect, rises in her demand, urges her petition with a louder voice, and with more forcible arguments; and for its protection, the animal body is made capable of resisting heat and cold in a wonderful manner, and preserves an equal temperature in a burning, and in a freezing atmosphere.

There is a still further excellence or superiority in the natural machine, still more as-

tonishing, still more incomprehensible; namely, a power to perpetuate, as well as to preserve itself.

A dead statue, a painted shadow on a canvass, or, perhaps, a little brazen clock-work, is the supreme pride of the art of man—his highest excellence and boast.

On the other hand, how glorious and skillful an artificer would he be called, could he but make two of these pieces of clock-work, and so contrive the hidden springs and motions within them, that they should perpetuate their kind, and thus to continue the same sort of clocks, in more than a thousand successions, down to the present day.

Such is the workmanship of God! such the amazing power of his will! such the long reach of his foresight, who has long ago guarded against all possible deficiencies; who has provided energy in nature sufficient to replenish the world with plants and animals to the end of time, by the wondrous contrivance of his creation, and the laws he then ordained.

Not all the united powers of human nature, nor a council of the nicest artificers, with all their ingenuity and skill, can ever form a simple feather or a tulip, yet man can produce a man—admirable effect, yet artless cause! a poor limited inferior agent! the plant and the brute in this matter are his rivals, and his equals too.

The human parent, and the parent bird, form their own images with equal skill, but are confined by a kind of divine patent, each to his own work: so the iron seal transfers its own figure to the wax, with as much exactness and curiosity as the golden one; both can only transfer their own figure.

Perhaps there is not a lilly or a butterfly in the world, but has gone through six thousand ancestors, and yet the work of the last parent is exquisitely perfect in shape, in colour, and in every perfection a beauty, but it is all owing to the first cause.

Who can know and consider, says the celebrated Dr. Hunter, the thousand evident proofs of the astonishing art of the Creator, in forming and sustaining an animal body,

such as ours, without feeling the most pleasing enthusiasm? can we seriously reflect on this awful subject, without being almost lost in adoration? without longing for another life after this, in which we may be gratified with the highest enjoyment, which our faculties and nature seem capable of, the seeing and comprehending the whole plan of the Creator, in forming the animal body, and in directing all its operations? The man who is really an anatomist, yet does not see and feel what we have endeavoured to express in words, whatever he may be, in other respects, must certainly labour under a dead palsy, in one part of his mind.—Milton could look upon the sun in noon-day without seeing light; but the nerves of that organ were insensible.

But further, the great Creator has made us an invaluable present of the senses, to be the inlets of innumerable pleasures, and the means of the most invaluable advantages.

The eye, in its elevated station, commands the most enlarged prospects.

Consisting only of gelatinous fluids, enclosed within coats, it shews us all the graces and glories of nature.

How wonderful, that an image of the hugest and widest landscape, should enter the small pupil ! that the rays of light should paint on the optic nerve, paint in an instant of time, paint in the truest colours, and exactest lineaments, every species of external objects.

The eye is so tender, that the slightest touch might injure the delicate frame.

It is guarded, therefore, with peculiar care, entrenched deep, and barricaded round with bones.

As the smallest fly might incommode its polished surface, it is further protected by two substantial curtains.

In sleep, when there is no occasion for the sense, but a necessity to guard the organs, the curtains close of their own accord.

At other times, if danger threaten, they fly together as quick as thought.

They are lined with an extremely fine membrane, moist with its own dew.

Its bristly palisades ward off the sweat of the brow, and moderate the too strong impressions of the light.



As in our waking hours we have almost incessant need for these little orbs ; they run upon the finest castors, rolling every way with the utmost ease ; which circumstance, added to the flexibility of the neck, renders our two eyes as useful as a thousand.

The ear consists of an outward porch, and an inner room.

The porch, somewhat prominent from the head, is of a cartilagenous substance, and wrought into sinuous cavities.

These, like circling hills, collect the wandering undulations of the air, and transmit them with a vigourous impulse to the finely stretched membrane of the drum.

This is expanded upon a circle of bones, over a polished reverberating cavity. It is furnished with braces that strain or relax, as the sound is faint or strong.

The hammer, and the anvil, the winding labyrinth, and the sounding galleries, these and other species of mechanism, all instrumental to hearing, are inexpressively curious.

Amazingly accute must be the auditory nerves, since they answer the smallest tremors

of the atmosphere, and distinguish their most subtile variations when combined.

These cords, turned by an Almighty hand, and spread through the echoing chambers, receive all the impressions and sounds, and propagate them to the brain.

These give existence to the charms of music, and the still nobler charms of speech.

The eye is useless amidst the gloom of night; but the ear hears through the darkest medium.

The eye is on duty only in our waking hours; but the ear is always accessible.

As there are concussions of the air, which are discernable only by the instruments of hearing, so there are odoriferous particles wafted in the air, which are perceivable only by the smell.

The nostrils are wide at the bottom, that more effluvia may enter; narrow at the top, that when entered they may act more strongly.

The streams that exhale from fragrant bodies, are far beyond imagination.

Microscopes that shew thousands of animals in a drop of water, cannot bring one of

these to our sight. Yet so exquisite are the olfactory nerves that they arrest the vanishing fugitives ; they imbibe all the roaming perfumes of the spring, and make us banquet even on the invisible dainties of nature.

Another capacity for pleasure which our bountiful Creator has bestowed on us, is the power of taste.

This is circumstanced in a manner so benignly and wisely, as to be a standing PLEA for temperance, which sets the finest edge on the taste, and adds the most poignant relish to its enjoyment.

To all these, as a most necessary supplement, is added the sense of feeling.

The crowning gift, however, which augments the benefits accruing from all the senses is—reason.

After having admitted, in its fullest extent, every fair comparison that can be made, between man and the most perfect of the other animals ; acknowledging that both have bodies of matter organized in many respects alike ; that the bodies of both are made up of bones, muscles, and blood vessels ; organs.

of respiration, circulation, and digestion ; that both have brain and nerves, apparently of the same substance and texture ; that in both, are the powers of will, of sensation, and of motion ; that both possess five senses of the same nature, and have a resemblance in many of their appetites, and inclinations ; after all those concussions, the internal faculties of the most intelligent of the brute creation, will be found, upon a just estimation, at a prodigious distance beneath those of man.

The actions of the one seem to proceed from the impulse of some want, the incitement of some appetite, or some controlling spring within them, which obliges them to perform the same thing in the same manner ; so that all their boasted works, the labours of every species, and every individual of the species, are as uniform, as if they all had been cast in the same mould. This appears in their nests, in their cells, for all their works, which astonish us, are formed by an inevitable necessity, like the growing of a plant, or the crystallization of a salt.

One race of the most intelligent species, never improves upon a former, nor one individual upon another.

At the end of the elephant's long life, what does he know, that he did not know at the beginning? What does the young elephant know from the experience of his father?

Even attention to their young, the most universal and most amiable part of the character of irrational animals, seems independent of sentiment and reflection, and to proceed from the same blind impulse, which prompt them to build such a kind of nest, and sit such a time on their eggs; for after a short period, those young are entirely neglected, and no trace of affection, or the smallest tender recollection seems any longer to subsist between the parent and the offspring.

How different is this from the sensation of the human species? Where the father and the mother feel their youth restored, and their existence multiplied in their children; whom they endeavour to turn from the allurements of folly; and by creating in their mind, a desire of knowledge and useful attainments;

they save from the wretchedness of vacancy, and contempt, attendant upon ignorance, who encourage their exertions, and support them under disappointments ; whose chief happiness depends on the prosperity of their offspring, and who feel the approach of age without sadness ; while the evening of their lives is brightened by the rising reputation of their children.

Sometimes by the strong and harmonious voice, man is found celebrating, in a poem, the virtues of a hero.

At other times, by a stroke of the pencil, he changes a dull and flat canvas, into a charming perspective.

There do we see him, with a chissel and graver in his hand, imitating the marble, and giving life to brass.

Here with the plummet and square, erecting a magnificent palace.

Now do we behold him by the assistance of a microscope, of his own invention, discovering a new world, amidst invisible atoms, or penetrating the secret exercise and structure of a particular organ.

At other times, by changing this microscope into a telescope, he pierces into the heavens, and there contemplates Saturn and his ring.

Returning home, he prescribes laws to these celestial bodies, describes their paths, measures the earth, and weighs the sun.

Afterwards, directing his attention towards the more useful study of organized beings, he dives into the laws of the animated fibres, examines the relations of different parts, and by an attentive view of the various perfections, he sees a chain which comprehends the whole.

But the most perfect mark of the greatness of man, and his high exaltation above other animals, is the commerce he holds with his Creator.

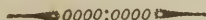
Wrapped in the thickest darkness, the rest of the animal creation are ignorant of the hand that formed them.

They enjoy an existence, but cannot trace the author of life.

Man alone soars to God, the principal of all existence ! prostrate at the foot of the



throne of the Almighty ; he adores with the profoundest sentiments of veneration ; he feels the most lively gratitude towards the ineffable goodness of his Creator.

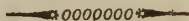


“ Know, then, **THYSELF** ! presume not God to scan ;  
The proper study of mankind—is **MAN**.”



Having presented the Plan, with the noble Elevation attached to it, and directed a character to the varied departments in the ANIMAL ECONOMY, to show the whole a complete master-piece of creating skill ; let us in the next place, reflect on and consider the manner in which the latent vital principal is nourished and excited into action, and the means by which it affords a constant evolution of

## Animal Heat.



IT is worthy of observation, that man, in a living state, together with the other subjects belonging to the class mammalia, as well as the whole feathered race, are distinguished from the rest of the animal kingdom by this peculiarity, that the native heat of their body far exceeds, in degrees of temperature, the usual heat of the medium or element, in which they live. With respect to man himself, it is however, to be remembered, that he appears

to be inferior in the heat of his system, to those other kinds of animals we have just mentioned. Thus, in our climate, the heat of the human body generally stands at about the 96th degree of Fahrenheit's scale; whereas, in other animals belonging to the class mammalia, the vital temperature very considerably exceeds this point, while it ascends still higher in individuals of the feathered tribes.

The degree of native heat possessed by an healthy person, is so constant and uniform, that, in general (provided we make allowance for the state of health peculiar to each individual) its range will include but a very few degrees of the thermometer, whether the subject be exposed to the inclemencies of the most rigorous climate, or placed beneath the fervors of a tropical sky; for the opinion formerly delivered by Boerhaave, that man has not a power of existing in a medium of such a nature as exceeds, in temperature, the native heat of his own body, has, since the famous observations of that illustrious traveller, and former governor of Georgia, H. Et-

lis, been refuted by a great number of characters, learned in the science of physiology, and the reverse completely demonstrated, and established by experiments well adapted to the nature of the subject. In this particular, indeed, appears to consist one of the great prerogatives of MAN; that imprisoned and confined to no one climate, or zone of the earth, he is able to pass his life in any section of the immense globe we inhabit, and is free to fix his habitation either beneath the rigours of Hudson's stormy region, where the quicksilver sinks into a state of complete congelation; or in the bosom of those glaring solar fires, which scorch the glowing shores of the Senegal.

Many hypothesis were advanced by the ancients, to account for the origin and source of that astonishing fire which minutely prevades our bodies, and uniformly supplies them with the necessary degrees of warmth; but their opinions were enveloped in obscure conclusions, until that justly celebrated character, J. Mayow, sketched out the leading traces and first great out-

lines of this doctrine, which in our time has been greatly improved. The lungs are now justly considered as the focus, or fire-place, where animal heat is generated, and the dephlogisticated part of the air, which we breathe, the fuel that supports the vital flame. This doctrine has been greatly extended, and further elucidated by the labours of the illustrious Crawford, who, appears to be the first who attempted to ascertain by direct experiments, the cause of animal heat, as depending upon the air. In an elaborate work, he maintains that the blood, which is returned to the lungs, is highly charged with phlogiston. That the air having a greater affinity to phlogiston than to the blood, attracts to itself that principle, and having in consequence a less capacity for heat than before, it parts with a portion of its heat : and as the capacity of the blood, for heat is, at the same time, increased by the separation of the phlogiston, the heat, detached from the air, is fixed in a quiescent or latent state in the blood ; and that the blood in the course of the circulation, absorbing phlogiston, and thereby having its

capacity for heat diminished, part of it (in proportion to the quantity of phlogiston absorbed) breaks out in the form of sensible or moving heat, and hence the cause of animal heat :—

### *Qultum in parbo.*

That is, in respiration, the blood is discharging phlogiston, and absorbing heat ; and that in the course of the circulation, it is continually imbibing phlogiston, and emitting heat.

Having treated of animal heat, and advanced the opinions of those who have produced many ingenious experiments to prove the manner in which it is generated and diffused through the system ; let us next adduce some cases to shew the dreadful results from supersaturating the system with alcohol or ardent spirits, long continued.

Bartholine relates the case of a person who having drunk much brandy for a wager, died after an eruption of a flame of fire had first issued from his mouth.

The inflammable woman of Coventry, as described by Mr. Wilmer, appears also to have reduced herself by dram-drinking, to

such a state as to be capable of being set on fire, and burnt like any combustible matter. So eager, says the learned Dr. Beddoes, were the principles of which she was composed to combine with oxygen.

In like manner, the Countess Cornelia Bandi, near Cessina, in Romagne, in 1731, in the 62d year of her age, was found in the middle of her bed-chamber reduced to ashes.

An instance of the same kind occurred at Christ Church, in Hampshire, June 26, 1613. John Hitchell, a carpenter, of that parish, who was extremely intemperate, having ended his day's work, came home and went to bed; his wife found him dead before morning at her side, he felt so extremely hot that it was impossible to touch him; he lay burning for three days, nor was there any appearance of flame outwardly, but only a smoke or mist ascending from his body, till it was consumed.

On the night of the first of January, 1773, in Partition-street, in this city, a woman who had been long in the habit of intemperance, was found in her room the next morning



consumed to ashes : the ashes were light, and left on the hand a greasy and sticky moisture ; the floor and walls were moistened with a gross unpleasant matter, and the furniture was covered with a fat, sooty substance, suspended in flakes. Our author was a witness to this sad scene on the following morning.

Doctor Whitaker, physician in ordinary to king Charles the 2d. published a work entitled “ the tree of human life ; or, the blood of the grapes,” proving the possibility of maintaining life from infancy to extreme old age, without sickness, by the **USE** (not the **ABUSE**) of generous wine.

It is the observation of an elegant writer, that events arise from debauch, which are sometimes fatal, and always such as are disagreeable. With all man’s reason and good sense about him, his tongue is apt to utter things out of mere gaiety of heart, which may displease his best friends : who then would trust himself to the power of wine, if there was no other objection against it than this, that it raises the imagination, and depresses the judgment ?

Alexander, having invited several of his friends and general officers to supper, proposed a crown as a reward for him who should drink most. He who conquered on this occasion was Promachus, who swallowed fourteen measures of wine; that is, eighteen or twenty pints. After receiving the prize, which was a crown worth a talent; that is, about a thousand crowns, he survived his victory but three days. Of the rest of the guests, forty died of their intemperate drinking.

When this same prince was at Babylon, after spending a whole night in revelling, a second was proposed to him, he went accordingly; there were twenty guests at table: he drank to the health of every person in company, and then pledged them severally; after this, calling for Hercules' cup, which held an incredible quantity, it was filled, and he drank it all—drinking to a Macedonian of the company, Proteas by name, and afterwards pledged him again, in the same furious and extravagant bumper. He had no sooner swallowed it, than he fell upon the floor. “Here then,” cries Seneca (describing the

fatal effects of inebriety,) "this hero unconquered by all the toils of prodigious marches, exposed to the dangers of sieges and combats, to the most violent extremes of heat and cold ; here he lies, subdued by his intemperance, and struck to the earth by the fatal cup of Hercules."

In this condition he was seized with a fever, which in a few days, terminated in death. He was 32 years and 8 months old, of which time he had reigned twelve years. No one, says Plutarch and Arian, suspected then that Alexander had been poisoned ; the true poison which brought him to his end was the **ABUSE** of wine. It was says Seneca (Epis 83) *Intemperantia bibendi ; et ille Herculeus ac fatalis scyphus condidit.*

It was a custom among the Lacedemonians to expose their intoxicated slaves to their children, who, by that means, conceived an early aversion to a vice, which makes men appear so monstrous and irrational.

IN this place our readers will permit us to present a parallel between animal life and the burning of a lamp ; and conclude with an allegorical illustration of the diseases of extreme old age extinguishing the lamp of life.

If an animal be placed in the exhausted receiver of an air pump, it quickly expires ; in similar circumstances, a burning lamp goes out. If an animal be not supplied with fresh air, it dies, and its heat is extinguished ; so it is with the lamp. The air breathed by animals is diminished in quantity, so it is by the burning of the lamp ; a certain quantity of air supports an animal a certain time, but no longer ; so it will keep up the flame of the lamp, for a certain time only. The air in which a lamp has burnt out, destroys animal life ; so the air that the animal hath breathed, puts out the lamp. Fixed, azotic, and inflammable airs, destroy animals, so likewise do they extinguish the lamp.

A living animal, and a burning lamp, therefore exactly agree in requiring the same kind of air to support them, and in producing the

same effects upon the air to which they are exposed.

But they do not resemble each other only in producing heat, and requiring the same kind of air ; for if an animal hath not fresh supplies of food, as well as air, after a certain time it dies, and becomes cold ; just in the same manner as the lamp dies, if not duly supplied with oil or nutriment.

## Old Age, AND ITS DISEASES,

Commence with the aberrations of the mind. Perceptions are less lively in old men ; the ideas and images of things are confounded, and the memory decays ; whence the intellectual faculties must necessarily loose their strength or power by degrees. Cicero says, that reason is the light and splendor of life. Thus the faculties of the mind decaying, may be compared to the luminaries of the world obscured.

The senses also, in old age, manifest a sensible deprivation.

And first, of sight. The expression of "looking through holes shall be darkened," refers to dimness of sight, which most people far advanced in life, experience.

As to taste,—from a diminution of appetite, and the want of teeth to comminute the food, the aged eat with less relish. Sleep is the sweet soother of our labours, and the restorer of our exhausted strength ; the loss of appetite and disgust of food robs us of this comfort. Sleep, in extreme old age, is short and interrupted, though weakness would require longer rest.—Hence old persons are wakeful and frequently rise early. Hearing, in the third place, claims our inquiry. The figurative expression, "the daughters of music shall be of no avail," alludes to a gradual extinction of sounds, for, at this time of life, not only the pleasures of harmonious sounds is sought in vain, but, what is more disagreeable, the words in conversation are not easily understood ; hence one of the greatest enjoyments of life is gradually lost.

The defects of the sense of hearing is followed by that of smelling. The sense of

feeling is uniformly diffused over the whole system, so that we may be sensible of the impulses of external substances. This sense, besides the other uses, contributes much to the safety of the body, and the removal of many evils to which it is perpetually exposed. Old persons are timid in walking, even on a plain surface, from extreme imbecility of their limbs, and, by the sense of feeling, they do not soon enough detect a rough inequality, and, in consequence, are in hazard of falling, and therefore, are not unjustly represented as "being afraid."

The only one that remains of the senses, is that of smelling. Old persons seem to live in a perpetual winter, and no longer perceive the agreeable odours exhaling from plants and flowers, in the spring and summer season.

Loss of strength in old age does not terminate in the limbs, or extremities of the body; the spine of the back loses considerably its firmness, by the daily diminution of power in its muscles and ligaments; hence an old man can seldom stand upright, but



stoops his body towards the earth which is shortly to cover it.

The last calamity we shall describe, as attached to old age, is, that the whole body is afflicted. The very course of the blood is interrupted, as in difficult respiration, apoplexia, lethargies, faintings, &c. The heart, also, the salient angle of life, sickens and sinks through want of its usual stimuli, and the whole system falls into dissolution.

The ancients, indeed, were not acquainted with the circulation of the blood; but they could not be ignorant that it moved through the body; that it cherished the viscera and members, by its heat; and lastly, that it concreted and grew cold in death.

The discovery of the circulation of the blood was left to the immortal Harvey, who chased away the clouds of obscure conclusions, and presented the world a legacy of invaluable worth. He was born at Folkstone, England, in 1578, and published the discovery of his vast labors in the year 1628. He died in 1657, leaving his estate to the College, to which he had before built a library, museum

and combination-room. Noble patriotism !  
worthy of imitation and himself.

Harvey is considered the discoverer of  
the circulation of the blood, in as strict a  
sense, as Pythagoras is said to have invented  
the 47th proposition of Euclid's Elements,  
or Lord Neper the Logarithms.

We shall conclude this section, on the dis-  
eases of old age, and that period to which few  
attain—"the death of nature," with the fol-  
lowing quotation.

"Virtue, the strength and beauty of the soul,  
It pleases and it lasts ; a happiness  
That even above the frowns and smiles of fate,  
Exalts great nature's favorites ; a wealth  
That ne'er encumbers, nor to baser hands  
Can be transferred ; it is the only good  
Man can justly boast of, or can call his own."

Our original plan being closed, a few miscellaneous tracts, we presume, will be considered as not irrevelant to our purpose.

IT is an ancient and approved maxim, that a life, guided entirely according to the directions of art, must be a miserable one. And the most judicious practitioners, sensible of the justness of the observation, and that what is prohibited is often the most eagerly coveted, have endeavoured to give, even to persons labouring under disease, as great latitude as possible in the articles of diet; and to reconcile every part of the regimen they prescribe, as nearly as they can, to the common mode of living—in order that the patient may be reminded as little as possible of his misfortune.

With respect to quantity, it is evident that this must be regulated by our feelings; a healthy man may be said not to exceed in the quantity of his meal, if he finishes it with a relish for more; if, immediately after eating, he can if required, follow any employment, that does not demand strong exercises, or violent exertions, which to persons in easy circum-

stances will rarely be necessary, and ought in general to be avoided, as it disturbs digestion, though daily practised, from necessity by the labouring poor.

Drinking intemperately, is so ungentlemanly a vice, that it would be an affront to suppose that persons of polished manners could be capable of it ; we have enumerated cases and the train of evils that, in time, is certain to attend this practice ; we admit one generous glass for digestion, a second for our relations, a third for the President of the United States, a fourth for our country, and *if a fifth it must be* for our enemies.

We think it will not admit of a doubt that beer or water is the only drink necessary in early youth, and that wine and spirituous liquors of which luxury has introduced a variety ought to be appropriated solely to the *middle period*, to the comfort of convalescents and invalids, to gladden and invigorate the heart, and give a cheerful countenance to old age.

The diseases of hot climates are all the diseases of exhaustion, caused by the too powerful action of the stimulus of heat, hence the

necessity of taking, frequently, cool acidulated drinks, which restore the tone of the fibre by absorbing the heat, and preventing its stimulant action.

Thirst is a state of the system opposed to that of hunger, it is a sensation which indicates a state of exhaustion, a deficiency of oxygen ; oxygenated remedies therefore are required.

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*To our Young Medical Friends.*

Should your destiny in life lead you to go a long voyage to the Eastern continent, or West-Indies, the following is an excellent anti-scorbutic, and refreshing diet, at sea or land, in hot climates.—It is called souins, an acidulous preparation of oat-meal, and deserves much attention. It is prepared by pouring hot water on oat-meal, and suffering it to stand till it has become sourish ; decant the liquor, which is to be boiled to the consistence of a jelly, and may be procured on ship board ; the macerated oat-meal may be made like mush or supon, and eaten with sugar or syrup, for the ship's company.

*Exposition of the manner in which the oxide of mercury operates in the system.*

In passing through the body it parts with its oxygen, and it is this oxygen alone, which remains combined with the system, that the effect produced by oxidated mercury is owing; this effect is the mercurial disease; that is, a salivation, the symptoms of which are those of the scurvy; they affect the mouth, gums, and the whole system, in a manner extremely analogous; the oxide of mercury will pass through the skin in a metallic form, and amalgamate itself with rings, and the gold in a pocket. [Note. The calces of all metals are oxides]

Vegetable and mineral acids contain vast quantities of oxygen. It is in proportion to the quantity of oxygen in the composition of acids that they allay the sensation of thirst; thus vegetable acids are the best remedies against the effects of narcotic poisons (as opium, &c.) for by their decomposition they restore to the fibre the oxygen which the poison had deprived it of. Vinegar taken in large

doses cures the state of exhaustion by a strong dose of opium, and prevents death, which might otherwise ensue. It is a well known fact, that inebriated persons become sober by drinking a glass of vinegar ; that is, the vinegar restores the tone of the system, which it had lost by the alcohol contained in the wine, a great quantity of water produces the same effect.

---

*Irritability is the principal of Life, and oxygen is the principle of irritability.*

In palsied limbs, the muscles retain their sense of irritability, and faculty of motion, if there be applied a topical stimulus, such as electricity, galvanism, cautery, &c. But the nerves which go to the muscles are so diseased or compressed, that they do not transmit the impression of the will.

---

The bite of a viper, or other venomous reptiles, is said to be cured by frequent washings with a solution of pot-ash; the cure in-



licated presumes the presence of an acid, and the remedies resorted to are alkalies to decompose this acid, which is admitted through the medium of a wound produced from the bite of the animal, under the influence of excess of caloric ; in such accidents fear often destroys the effects of remedies, and prevents a cure, by producing a repulsion of the fluid from the surface to the more noble parts of the circulation.

---

Preservatives against, and cure of yellow fever, or other malignant affections in hot climates, or in our summer months, particularly where a great range of heat in the atmospheric temperature prevails, combined with moisture, depend upon the means proper for keeping at a distance both within and without the body, an excess of caloric.

---

We recommend to public patronage, those young physicians of genius, who are brought forward and supported in their profession by

the approbation of those who are judges of heir merits. Happy country ! where Science, aided by the genius of Liberty, unfolds, and is rapidly diffusing her riches through every part of her widely extended territory ! May “the wilderness and the solitary places be glad, and the desert rejoice and blossom as the rose.”

---

Anatomists, contemplating the different structure of animals, wherein the same effect is produced by an Omnipotent power, discover, “that in animals, the difference in “structure affixed to the organs of sensation, “constitute the main differences in percep- “tion,” and that the “powers of the nerves, “depend on the structure of the parts to “which they are connected.”

This doctrine is beautifully displayed by that first of Anatomists and Naturalists, the late John Hunter, who discovered also the absorbent system ; we believe we may say it is almost universally adopted, and in due time may be ranked the greatest discovery both in physiology and pathology that anato-

my has suggested since the discovery of the circulation of the blood.

---

Synopsis, or inventory of the different families in animated nature : there are six classes, as follows : animals having the

Heart furnished with two ventricles and auricles.	}	Viviparous---Mammalia
---	---	-----------------------

Blood warm and red.	}	Oviparous—Birds
------------------------	---	-----------------

One ventricle and auricle.	}	Respiration voluntary.	}	Amphibia
-------------------------------	---	---------------------------	---	----------

Blood cold and red.	}	Breathing by gills—Fishes
------------------------	---	---------------------------

One ventricle with one auricle.	}	Antennated—Insects
------------------------------------	---	--------------------

Sanies cold and colourless.	}	Tentaculated—Vermes
--------------------------------	---	---------------------

The number we present of each class of animals, are

1	Mammalia, affording milk,	53
2	Aves, or the feathered tribe,	195
3	Amphibia, partaking of two elements	25
4	Pisces, or the finny tribe,	79
5	Insects,	1691
6	Vermes, or worms,	198

"EACH seed includes a plant ; that plant again  
 Has other seeds, which other plants contain,  
 Those other plants have all their seeds ; and those,  
 More plants, again, successively inclose :  
 Thus every single berry that we find,  
 Has really in itself, whole forests of its kind,  
 Empire and wealth one acorn may dispense,  
 By fleets to sail a thousand ages hence :  
 Each myrtle seed includes a thousand groves,  
 Where future bards may warble forth their loves.  
 So Adam's loins contain'd his large posterity  
 All people that have been, and all that e'er shall be.

Amazing thought ! what mortal can conceive  
 Such wond'rous smallness !—Yet we must believe  
 What Reason tells, for Reason's piercing eye  
 Discerns those truths our senses can't descry."

MICROSCOPE.

---

MAN, whose intelligence rises superior to  
 every other animal, contemplating the vast  
 scale of beings, elevates his pious reflections,  
 and, in extacy, exclaims, " Lord how mani-  
 fold art thou in all thy works, in wisdom hast  
 thou made them all, and by thy GOODNESS  
 they are SUSTAINED.

FINIS.

# GLOSSARY.

---

## ATMOSPHERIC AIR,

### CONTAINS

72 parts of Azote	} Gass	{	Mephetic or contagious air
27 Oxygen, and			Vital air, or Acidifying principle
1 Carbonic Acid			Fixed, or unrespirable air.

Gas...A permanently elastic fluid, with some exceptions.

Caloric....Principle of heat, or heat extricated from whatever cause.

Phlogiston....Inflamable principle.

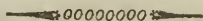
Oxide.....Rust of metals, generally speaking, and is also referrable to fluids.

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